PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Takuya Tsukagoshi
Application No.	:	10/827,152
Filed	:	April 19, 2004
For	:	METHOD FOR RECORDING AND REPRODUCING HOLOGRAPHIC DATA AND AN APPARATUS THEREFOR

Examiner	:	Audrey Y. Chang
Art Unit	:	2872
Docket No.	:	890050.481
Date	:	October 12, 2007

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL APPELLANT'S BRIEF

Commissioner for Patents:

This supplemental brief is being filed in response to the Notification of Non-Compliant Appeal Brief having a mailing date of September 17, 2007, which noted that the previously filed brief of August 16, 2007 was defective for not providing a statement of the status of all claims. The Notification of Non-Compliant Appeal Brief set a 30-day deadline for response. This present supplemental brief therefore is now being timely filed and includes the appropriate statement of status of all claims, and is in furtherance of the Notice of Appeal, filed in this case on June 21, 2007. The fees required under Section 41.20(b)(2) were previously paid.

I. REAL PARTY IN INTEREST

TDK Corporation is the assignee of the present application and is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIMS

Claims 1 and 3-6 are pending and were rejected. Claims 1 and 3-6 are being appealed. Claims 2 and 7 have been canceled.

IV. STATUS OF AMENDMENTS

There are no outstanding amendments. A response under 37 CFR 1.116 was filed on May 29, 2007, which canceled claim 7 that was rejected in the final Office Action of March 28, 2007 (hereinafter referred to as "the final Office Action"). An Advisory Action dated June 7, 2007 indicated that the May 29, 2007 response has been entered to cancel claim 7, thereby rendering moot and removing as issues for appeal the rejections of claim 7.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The embodiments provided by the present applicant are directed towards a method and apparatus for recording and reproducing holographic data that can prevent noise from being generated in a reproduced beam or servo beam. In accordance therewith, a signal beam and a reference beam having a wavelength of $\lambda 0$ are emitted from a first light source, and a servo beam having a wavelength of $\lambda 1$ (different from $\lambda 0$) is emitted from a second light source. In the disclosed embodiments, the servo beam and the signal and reference beams are emitted at the same time.

The signal beam has its optical path set such that the signal beam is projected onto regions of a servo layer in which servo projection structures are not formed, while the servo beam has its optical path set such that the servo beam is projected onto regions of the servo layer in which the servo projection structures are formed.

In order for the signal beam and the servo beam to be projected onto these different regions of the servo layer, their respective optical paths are set to be different. The different optical paths can be provided, for example, by using a diffraction grating, a tilted mirror, or other techniques.

The following discusses independent clams 1, 3, and 6 with reference numbers indicating those claim elements being read on the embodiments disclosed in the specification (including figures). Furthermore, the information in parenthesis provide specific page, line numbers, and drawing references to example embodiments corresponding to the elements recited in the claims. Of course, the reference numbers and parenthetical information are illustrative only and are not intended to limit the claims to only the exact embodiments shown and described in the specification (including the figures).

Claims 3-5 contain means-plus-function elements. According to 37 CFR 41.67(c)(1)(v), such means-plus-function elements "must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters." Accordingly, the following shows claims 3-5 together with the required information in parentheses.

1. A holographic recording and reproducing method a) for recording data in a holographic recording medium **(220 in Figures 2-3 and 620 in Figure 6)** comprising at least a recording layer **(18 in Figure 1 and 221 in Figures 2-3 and 6)** in which data are to be recorded as phase information of light by projecting a signal beam **(12 in Figure 1; 211a in Figures 2 and 4-5)** and a reference beam **(211b in Figure 2)** emitted from a first light source **(201 in Figure 2 and 601 in Figure 6)** and having a wavelength $\lambda 0$ **(page 9, line 26)** thereonto and a servo layer **(223 in Figures 2-4 and 623 in Figure 6)** disposed on an opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the holographic recording medium having regions in which servo projection structures **(16 in Figure 1 and 224 in Figures 3-5)** are formed and b) for reproducing holographic data from the holographic recording medium by projecting the reference beam onto the holographic recording medium, the holographic recording and reproducing method comprising:

setting a first optical path of the signal beam so that the signal beam is projected onto other regions **(17 in Figure 1 and 225 in Figure 3)** of the servo layer than regions in which the servo projection structures are formed **(page 4, lines 15-17; page 11, line 14 through page 12, line 26; and Figures 1-2 and 4-6)**; and

setting a second optical path, different than the first optical path, of a servo beam emitted from a second light source **(231 in Figure 2 and 612 in Figure 6)** and having a wavelength $\lambda 1$ **(page 14, lines 20-27)** different from that of the signal beam so that the servo beam is projected onto one of the regions of the servo layer in which the servo projection structures are formed **(page 4, lines 17-20; page 13, line 25 through page 14, line 15; and Figures 1-2 and 4-6)** after passing through an objective lens **(14 in Figure 1; 207 in Figures 2 and 4-5; and 611 in Figure 6)** through which the signal beam passes and projecting the servo beam onto the servo layer along the thus set optical path of the servo beam **(page 4, lines 20-23; page 14, lines 14-19; and Figures 1-2 and 4-6)**,

the servo beam being emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source **(page 7, lines 22-26; page 16, line 27 through page 17, line 4; and Figures 2 and 4-6)**.

3. A holographic recording and reproducing apparatus **(page 6, lines 20-22; page 7, lines 3-5; and Figures 2 and 6)** a) for recording data in a holographic recording medium **(220 in Figures 2-3 and 620 in Figure 6)** comprising at least a recording layer **(18 in Figure 1 and 221 in Figures 2-3 and 6)** in which data are to be recorded as phase information of light by projecting a signal beam **(12 in Figure 1; 211a in Figures 2 and 4-5)** and a reference beam **(211b in Figure 2)** thereonto and a servo layer **(223 in Figures 2-4 and 623 in Figure 6)** disposed on an opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the holographic recording medium having regions in which servo projection structures are formed **(16 in Figure 1 and 224 in Figures 3-5)** and b) for reproducing holographic data from the holographic recording medium by projecting the reference beam onto the holographic recording medium **(page 4, line 24 through page 5, line 8)**, the holographic recording and reproducing apparatus comprising:

signal beam path setting means **(205, 206, and 235 in Figure 2; 604, 606, 608, 609, and 610 in Figure 6; and page 22, lines 10-22)** including an objective lens **(14 in Figure 1; 207 in Figures 2 and 4-5; and 611 in Figure 6)** for converging the signal beam and adapted for setting a first optical path of the signal beam so that the signal beam is projected onto other

regions of the servo layer than regions in which the servo projection structures are formed **(page 5, lines 10-12; page 11, line 14 through page 12, line 26; and Figures 1-2 and 4-6)**;

servo beam path setting means **(234, 235, and 207 in Figure 2; 234 and 207 in Figure 5; 614, 606, 608, 609, and 610 in Figure 6; and page 22, lines 10-22)** for setting a second optical path of a servo beam different from the first optical path of the signal beam so that the servo beam is projected onto one of the regions of the servo layer in which the servo projection structures are formed **(page 5, lines 12-16; page 13, line 25 through page 14, line 15; and Figures 1-2 and 4-6)** after passing through an objective lens through which the signal beam passes and projecting the servo beam onto the servo layer along the thus set optical path of the servo beam **(page 5, lines 16-18; page 14, lines 14-19; and Figures 1-2 and 4-6)**;

a first light source **(201 in Figure 2 and 601 in Figure 6)** to emit the signal beam and the reference beam having a wavelength $\lambda 0$ **(page 9, line 26)**; and

a second light source **(231 in Figure 2 and 612 in Figure 6)** to emit the servo beam having a wavelength $\lambda 1$ **(page 14, lines 20-)**,

the first light source and the second light source being driven simultaneously, thereby simultaneously emitting the signal beam, the reference beam, and the servo beam **(page 7, lines 22-26; page 16, line 27 through page 17, line 4; and Figures 2 and 4-6)**.

4. A holographic recording and reproducing apparatus in accordance with Claim 3, wherein the servo beam projecting means comprises beam deflecting means **(235 in Figures 2 and 4; 234 in Figure 5; 610 in Figure 6; and page 22, lines 10-22)** for deflecting the servo beam in a predetermined direction so that the servo beam impinges on the objective lens with an incidence angle different from that of the signal beam.

5. A holographic recording and reproducing apparatus in accordance with Claim 4, wherein the beam deflecting means comprises a diffraction grating **(235 in Figures 2 and 4; and 610 in Figure 6)** disposed on an incidence side of the servo beam with respect to the objective lens.

6. A holographic recording and reproducing method a) for recording data in a holographic recording medium **(220 in Figures 2-3 and 620 in Figure 6)** comprising at least a recording layer **(18 in Figure 1 and 221 in Figures 2-3 and 6)** in which data are to be recorded as phase information of light by projecting a signal beam **(12 in Figure 1; 211a in Figures 2 and 4-5)** and a reference beam **(211b in Figure 2)** emitted from a first light source **(201 in Figure 2 and 601 in Figure 6)** and having a wavelength $\lambda 0$ **(page 9, line 26)** thereonto and a servo layer **(223 in Figures 2-4 and 623 in Figure 6)** disposed on an opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the servo layer having servo projection structures **(16 in Figure 1 and 224 in Figures 3-5)** b) for reproducing holographic data from the holographic recording medium by projecting the reference beam onto the holographic recording medium, the holographic recording and reproducing method comprising:

setting a first optical path of the signal beam so that the signal beam is projected onto a first region **(17 in Figure 1 and 225 in Figure 3)** of the servo layer different from second regions of the servo layer on which the servo projection structures are formed **(page 4, lines 15-17; page 11, line 14 through page 12, line 26; and Figures 1-2 and 4-6)**;

setting a second optical path, different than the first optical path, of a servo beam emitted from a second light source **(231 in Figure 2 and 612 in Figure 6)** and having a wavelength $\lambda 1$ **(page 14, lines 20-27)** different from that of the signal beam so that the servo beam is projected onto one of the second regions of the servo layer on which the servo projection structures are formed **(page 4, lines 17-20; page 13, line 25 through page 14, line 15; and Figures 1-2 and 4-6)**, after passing through an objective lens through which the signal beam passes **(14 in Figure 1; 207 in Figures 2 and 4-5; and 611 in Figure 6)**; and

projecting the servo beam onto the servo layer along the thus set second optical path of the servo beam **(page 4, lines 20-23; page 14, lines 14-19; and Figures 1-2 and 4-6)**,

wherein the servo beam is emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source **(page 7, lines 22-26; page 16, line 27 through page 17, line 4; and Figures 2 and 4-6)**.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and 3-6 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Claims 1, 3-4, and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable Amble.

Claims 1, 3-4, and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Horimai (U.S. Patent Application Publication No. 2003/0063342 A1) in view of Amble (U.S. Patent No. 6,738,322).

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Horimai in view of Amble, and in further view of Matsui (U.S. Patent No. 5,784,353).

VII. ARGUMENT

A. Enablement of claims 1 and 3-6 under Section 112

To establish a *prima facie* case of lack of enablement, the Examiner "bears the burden of setting forth a reasonable explanation as to why she believes that the scope of protection by that claim is not adequately enabled by the description of the invention provided in the specification of the application; this includes, of course, providing sufficient reasons for doubting any assertions in the specification as to the scope of enablement." *In re Wright*, 999 F.2d 1557, 1561-1562 (Fed. Cir. 1993).

The Examiner has not established a prima facie case of non-enablement, because the Examiner has not provided a *reasonable explanation* in support of the rejections. In particular, in rejecting claims 1 and 3-6, page 3 (section 4) of the final Office Action stated the following:

> "The specification and the claims fail to teach why the diffraction grating (235) shown in Figure 2 is capable of making the servo beam and the signal beam that is incident on the diffraction grating in the SAME optical paten and the SAME incidence angle to be deflated differently. This generally will not happen for an ordinary diffraction grating. The

specification and the claims fail to teach what essential feature will make this happen which make the claimed feature concerning the optical path of the signal beam and the optical path of the servo beam being different from each other non-enable[d] by the disclosure."

This assertion of non-enablement by the final Office Action is traversed herein, since this assertion does not provide a reasonable explanation for lack of enablement.

As first grounds for traversing the non-enablement rejection due to lack of reasonable explanation by the Examiner, it is argued herein by the applicant that the specification as filed discloses various techniques that can be used to provide the signal beam and the servo beam with different optical paths. The use of the diffraction grating 235 of Figure 2 is just one possible example technique. Another example technique is disclosed in Figure 5, wherein a diffraction grating is not used. Instead of a diffraction grating, a dichroic mirror 234 is used to tilt the optical path of the servo beam 211c--when the servo beam 211c is impinged on the dichroic mirror 234, the servo beam 211c is reflected by the dichroic mirror 234. At this time, the optical axis of the servo beam 211 is thus tilted by an angle with respect to the optical axis of the signal beam 211a. *See, e.g.*, Figure 5 and page 16, line 27 to page 17, line 4 of the present application. As a result of having different optical paths, the signal beam 211a and the servo beam 211c are projected onto different regions of the servo layer 223.

Yet other example techniques for providing the signal beam and servo beams with different optical paths, instead of using a diffraction grating, are disclosed on page 22, lines 10-22 of the present application. This passage of the present application describes such other example techniques as follows:

"Further, in the embodiment shown in Figure 2, although the optical axis of the signal beam and the optical axis of the servo beam are made different using the diffraction grating 235, it is not absolutely necessary to use the diffraction grating 235 to make the optical axis of the signal beam and the optical axis of the servo beam different and any means capable of deflecting the servo beam in a predetermined direction suffices. For

example, the optical axis of the signal beam and the optical axis of the servo beam can be made different using a plane mirror having a discontinuous region along the axis perpendicular to the surface thereof or a concave mirror may be used for making the optical axis of the signal beam and the optical axis of the servo beam different. It is further possible to use a liquid crystal panel capable of deflecting a light beam in pixel units by refraction."

Thus, at least one embodiment different from a diffraction grating has been described in the present application to provide enablement for the limitations that the signal beam and servo beams have different optical paths. In view of these disclosed embodiments, the rejection of claims 1 and 3-6 for lack of enablement is improper.

With regards to the embodiment of Figures 2 and 4 that use the diffraction grating 235 to provide the signal beam 211a and servo beam 211c, the final Office Action is incorrect in stating as quoted above that "an ordinary diffraction grating" cannot cause "the servo beam and the signal beam that [are] incident on the diffraction grating in the SAME optical path and the SAME incidence angle to be deflated[sic] differently." Such a statement by the final Office Action represents a misunderstanding of the fundamental operation and properties of a diffraction grating, and is therefore an unreasonable explanation to support the non-enablement rejection.

As explained on page 7 of the REMARKS section of the applicant's amendment of January 16, 2007, it is well known to a person skilled in the art that when light is incident on a diffraction grating, diffracting and mutual interference effects occur, and light is transmitted in different directions. Stated in another way, it is well known to a person skilled in the art that even if two beams impinge on a diffraction grating in the same optical path and/or the same incidence angle, if they have <u>different wavelengths</u>, the two beams would be deflected in <u>different directions</u> by the diffraction grating. In the embodiments disclosed by the applicant, the signal beam has a wavelength of $\lambda 0$, and the servo beam has a different wavelength of $\lambda 1$, wherein for example, the wavelength $\lambda 1$ is longer than the wavelength $\lambda 0$. *See, e.g.*, page 14, lines 20-27 of the present application.

The Examiner appears to be agreeing with the above-explanation of a diffraction grating in page 8 (section 10) of the final Office Action, but nevertheless still maintained the non-enablement rejection using contradictory/inconsistent reasoning on the page 3 (section 4) passage of the final Office Action quoted above. In particular, the Examiner stated the following in page 8 (section 10) of the final Office Action (emphasis ours):

> "Firstly, being one skilled in the art the applicant must understand the diffraction properties of a diffraction grating is based on the wavelengths as well as the incident angle of the light beams on the diffraction grating, this means the optical paths for them will not be the same, since the angle of incident could be different."

The above-quoted statement from the final Office Action is consistent with (rather being than contradictory to) the applicant's prior arguments: the diffraction properties of the diffraction grating is based on the wavelengths of the signal beam and the servo beam ($\lambda 0$ and $\lambda 1$, respectively, which are different), and therefore the optical paths of the signal beam and the servo beam as deflected by the diffraction grating "will not be the same" (they will be "different" optical paths as recited in claims 1, 3 and 6).

In view of the various techniques discussed above and disclosed in the present application, the recitations of "*setting a first optical path of the signal beam*" and "*setting a second optical path, different than the first optical path, of a servo beam*" in claim 1; "*setting a first optical path of the signal beam*" and "*setting a second optical path of a servo beam different from the first optical path of the signal beam*" in claim 3; and "*setting a first optical path of the signal beam*" and "*setting a second optical path, different than the first optical path, of a servo beam*" clearly meet enablement requirements in accordance with 35 U.S.C. §112, first paragraph, since a person skilled in the art can make and/or use the invention claimed in these claims based on the description provided in the present application.

As second grounds for traversing the non-enablement rejection due to lack of a reasonable explanation by the Examiner, it is argued herein by the present applicant that the above-quoted non-enablement rejection is improper since the rationale to support said rejection

is based on a narrower limitation/scope to independent claims 1, 3, and 6 than that which said claims are entitled. Specifically, the above-quoted language on page 3 (section 4) from the final Office Action is making a determination of whether there is sufficient enablement solely on the basis of the properties of a "diffraction grating." However, independent claims 1, 3, and 6 do not specifically recite and are not limited to only a diffraction grating—instead, these claims contain language that is broader than (but can include) a diffraction grating, by specifically reciting "different" optical paths. As a result, enablement of claims 1, 3 and 6 should not be determined solely on the properties of a diffraction grating, but should instead be determined based at least in part on the various embodiments such as those disclosed in the present application that are capable of providing different optical paths for the signal beam and the servo beam.

As explained previously above, the present application does indeed disclose example techniques other than a diffraction grating in order to provide the signal beam and the servo beam with different optical paths, such as the embodiment described with respect to Figure 5. All of the disclosed embodiments, including the diffraction grating, enable one skilled in the art to make and/or use the invention claimed in claims 1, 3, 6 so that the servo beam and the signal beams are provided with different optical paths. By using only a diffraction grating to determine enablement for claims 1, 3, and 6, the Examiner is ignoring and not giving due weight to the other described embodiments that also provide an enabling disclosure for the limitations of claims 1, 3, and 6. Hence, the non-enablement rejection has not used a reasonable explanation in support thereof, and is therefore improper and should be withdrawn.

Dependent claim 5 specifically recites that the beam deflecting means comprises a "diffraction grating." This limitation is enabled by the diffraction grating disclosed and described in the specification as causing the servo beam 211c to be projected onto the spot position of the servo track different from that of the signal beam 211a. *See, e.g.*, Figure 2 and page 14, lines 14-19 of the present application.

As third grounds for traversing the non-enablement rejection, the applicant disagrees with the following statement(s) provided by the final Office Action on page 8 (section 10):

"In response to applicant's argument concerning the 35 USC 112, first paragraph rejection, the applicant is respectfully noted that there is no where in the claims suggest that the deflection is based on different wavelengths. In fact, the deflection means is only in the path of the servo beam, it seems to have nothing to do with the signal beam, wavelengths do not seem to be the factor."

The applicant disagrees with the above-quoted statements for a number of reasons. First, independent claims 1, 3, and 6 recite that the signal beam and servo beam have different optical paths—claims 1, 3, and 6 do not require specific recitation of (and therefore do not explicitly recite) *how* such different optical paths are provided, in order for said claims to be enabled. Indeed, claims 1 and 6 recite "setting a first optical path" and "setting a second optical path," which are both recitations that are enabled by the specification, such as by the diffraction grating 235 that can deflect based on the wavelengths λ0/λ1 or by the embodiment of Figure 5 that uses the tilted mirror 234 that is independent of the wavelength λ1. Second, claim 3 recites "signal beam path setting means … for setting a first optical path" and "servo beam path setting means for setting a second optical path." Since these limitations use means-plus-function language that falls within the scope of 35 U.S.C. §112, sixth paragraph, their scope is based on the structures disclosed in the specification and their equivalents—therefore, these claim limitations are supported not only by the diffraction grating embodiment, but also, these claim limitations are supported by the embodiment of Figure 5 and other disclosed embodiments that are independent of (*e.g.*, do not need to rely on) the different wavelengths λ0/λ1 in order to provide different optical paths. Third, the "deflection means" is ***not*** "only in the path of the servo light beam," as alleged by the final Office Action on page 8 (section 10). As clearly evident in Figures 2 and 4 (and accompanying description, such as on page 12, lines 12-13) of the present application, the diffraction grating 235 is in the path of not only the servo beam 211c ***but also*** the signal beam 211a. Fourth, the "deflection means" from the above-cited passage from page 8 (section 10) of the final Office Action appears to correspond to the "beam deflecting means" recited in dependent claims 4 and 5—this "beam deflecting means" is not explicitly recited in claims 1, 3, and 6--thus, it is improper for the final Office Action (on page 8, section

10) to support the non-enablement rejection of claims 1, 3, and 6 based on the "deflection means" that is not even recited in claims 1, 3, and 6.

For the reasons set forth above, claims 1 and 3-6 are supported by an enabling description with the meaning of 35 U.S.C. § 112, first paragraph. Therefore, the non-enablement rejection of claims 1 and 3-6 should be withdrawn.

B. Nonobviousness under Section 103

The Federal Circuit has held many times that to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Furthermore, if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Moreover, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

C. Section 103 rejections on the basis of Amble (singly)

1. Independent claim 1

Amble does not render unpatentable the invention recited in independent claim 1. The method of claim 1 recites *inter alia* (emphasis added):

> "*the servo beam being emitted from the second light source at a <u>same time</u> as the signal beam and the reference beam are emitted from the first light source*."

This feature of the signal and references beams and the servo beam being emitted at the same time appears to have been overlooked and/or not given due weight by the Examiner in the final Office Action. For example, in explaining the rejection on the basis of Amble on pages 6-8 of the final Office Action, the Examiner failed acknowledge the above-quoted claim limitation and further failed to cite any passage of Amble that meets said claim limitation.

On page 9 (section 10) of the final Office Action, the Examiner merely asserted that "they certainly can be taking place at the same time," but provided no citations to Amble, reasoning, or other explanation to support the assertion. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted at a same time as signal and reference beams from a second light source, is in itself evidence that no reference was available. Furthermore, Amble does not disclose, teach, or suggest this feature.

More specifically and as argued in the applicant's prior amendment of January 16, 2007, Amble discloses that a format hologram (format grating) 106 having a periodic, spatially modulated refractive index and defining a plurality of reflective Bragg fringes is formed in the read/write layer 90 by interfering the format hologram recording beams 100A and 100B. *See, e.g.*, column 8, line 37 through column 9, line 19 and Figure 3F of Amble. Page 9 (section 10) of the final Office Action has interpreted the format hologram recording beam 100A as the claimed "signal beam."

Amble further discloses that data are to be recorded by locally altering the format hologram 106 at a storage location 108 using a focused write beam 102. *See, e.g.*, column 8, lines 20-33 and Figure 3G of Amble). Page 9 (section 10) of the final Office Action has stated that the write beam 102 is not the claimed "signal beam." Amble additionally states in column 8, lines 24-37 that following formation of the format hologram 106 in the read/write layer 90, data are subsequently recorded in the read/write layer 90 via the write beam 102, which causes further polymerization in the photopolymer at selected data storage locations 108 to alter or delete the format hologram at the data storage locations 108.

Amble then further states on column 8, lines 35-37 that "Servo beam 104 will track servo layer 94 <u>during writing and readout</u> of medium 86" (emphasis ours). Accordingly, the servo beam 24 or 104 of Amble is projected onto the recording medium during the recording operation that uses the read/write beam 102. The servo beam 24/104, because it is used during

the subsequent recording operation applied to the existing format hologram 106 by the read/write beam 102, therefore is not projected onto the recording medium at the same time as the "format hologram recording beams" 100A and 100B that were previously projected onto the recording medium to initially form the format hologram 106. The servo beam of Amble (which is projected along with the read/write beam 102) thus appears to be projected after the format hologram recording beams 100A and 100B have been projected to interfere with each other to form the format hologram 106.

In page 9 (section 10) of the final Office Action, the Examiner cited Figures 4A-4D of Amble for support of the rejection. However, Figures 4A-4D in fact do not support the rejection. For example, the format hologram recording beams 100A and 100B are shown in Figure 4B; the read/write beam 102 is shown in Figure 4C; and the servo beam 104 is shown in Figure 4D. Clearly, the format hologram recording beams 100A and 100B are not concurrently shown in Figure 4D with the servo beam 104, thereby reinforcing the present applicant's position that said beams are not emitted at the same time.

Therefore, Amble does not meet the limitations of claim 1 that require "the servo beam being emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source."

Accordingly, claim 1 not obvious and is therefore allowable.

2. Independent claim 3 and dependent claims 4-5

Amble does not render unpatentable the invention recited in independent claim 3. The apparatus of claim 3 recites *inter alia*:

> "*the first light source and the second light source being driven simultaneously, thereby simultaneously emitting the signal beam, the reference beam, and the servo beam.*"

These limitations of claim 3 are not met by Amble, since as explained previously above, the servo beam 104 of Amble is not emitted simultaneously with the format hologram recording beams 100A and 100B. That is, the format hologram recording beams 100A and 100B

are used to initially form the format hologram 106. Subsequently during a later read/write operation, the servo beam 104 is emitted while the read/write beam 102 is used to record (read/write) data.

Since the servo beam 104 is thus being emitted after emitting the format hologram recording beams 100A and 100B, Amble does not meet the limitations of claim 3 that require "the first light source and the second light source being driven simultaneously, thereby simultaneously emitting the signal beam, the reference beam, and the servo beam." Furthermore, final Office Action has not cited any reference that meets this limitation. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted simultaneously as signal and reference beams from a second light source, is in itself evidence that no reference was available.

Claim 3 not obvious and is therefore allowable.

Dependent claims 4-5 depend on claim 3, and thus are nonobvious for the reasons set forth above.

3. Independent claim 6

Amble does not render unpatentable the invention recited in independent claim 6. The method of claim 6 recites *inter alia* (emphasis ours):

> "*the servo beam is emitted from the second light source at a <u>same time</u> as the signal beam and the reference beam are emitted from the first light source*."

These limitations of claim 6 are not met by Amble, since as explained previously above, the servo beam 104 of Amble is not emitted at the same time as the format hologram recording beams 100A and 100B. That is, the format hologram recording beams 100A and 100B of Amble are used to initially form the format hologram 106. Subsequently during a later read/write operation, the servo beam 104 is emitted while the read/write beam 102 is used to record (read/write) data.

Since the servo beam 104 is thus being emitted after emitting the format hologram recording beams 100A and 100B, Amble does not meet the limitations of claim 6 that require "the servo beam is emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source." Furthermore, final Office Action has not cited any reference that meets this limitation. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted at a same time as signal and reference beams from a second light source, is in itself evidence that no reference was available.

Claim 6 not obvious and is therefore allowable.

D. Section 103 rejections on the basis of Horimai and Amble

1. Independent claim 1

Horimai and Amble, whether singly or in combination, do not render unpatentable the invention recited in independent claim 1. The method of claim 1 recites *inter alia* (emphasis ours):

> "*the servo beam being emitted from the second light source at a <u>same time</u> as the signal beam and the reference beam are emitted from the first light source*."

As previously explained above, Amble does not meet this limitation, since his servo beam 104 is emitted during a read/write process *after* the hologram recording beams 100A and 100B have been emitted to initially form the formal hologram 106.

Horimai does not cure the deficiencies of Amble, since Horimai also does not supply this missing teaching. Indeed, in setting forth the rejections on pages 4-5 (section 6), the final Office Action was completely silent as to Horimai and/or Amble as meeting this claim limitation. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted at a same time as signal and reference beams from a second light source, is in itself evidence that no reference was available.

It is further evident that Horimai does not meet this limitation at all, since his servo beam is also emitted *after* his signal beam.

Specifically, Horimai discloses in his Abstract and paragraph [0132] that, for a *recording* process, an information light and a reference light are incident upon his optical information recording medium 1. In his paragraph [0133], Horima further describes a "reproduction signal RF" for the subsequent *reproduction* process, after the recording by the information light and reference light has been completed (emphasis ours):

> "In the present embodiment, the reproduction signal RF is a signal which is the reproduction of the information <u>recorded</u> in the address servo areas 6 of the optical information recording medium 1."

Thus from the above passage, it is abundantly clear that Horimai generates his reproduction signal RF during the *reproduction* process *after* he has emitted the information light of the *recording* process. Horimai then describes the following servo operation during his reproduction process (emphasis ours):

> "[0135] A servo operation will now be described with reference to FIG. 4. During a servo operation, all pixels of the spatial light modulator 18 are in a transmitting state. The output of the emission of light from the light source device 25 is set at a low output for reproduction. The controller 90 predicts the timing at which light that has exited the objective lens 12 passes through the address servo areas 6 <u>based on a basic clock reproduced from a reproduction signal RF</u> and maintains the above-described setting while the light from the objective lens 12 passes through the address servo areas 6."

> "[0137] … Based on the output of the quadruple photodetector 29, the detection circuit 85 shown in FIG. 3 generates the focus error signal FE, tracking error signal TE and <u>reproduction signal RF based on which focus</u>

> servo and tracking servo is performed; the basic clock is generated; and addresses are determined."

From the above-cited passages of Horimai, it is therefore abundantly clear that his servo operation, in which his light source device 25 emits servo light, is performed in response to the reproduction signal RF that has been generated. Thus, since the information light has already finished recording (*e.g.*, is no longer being emitted) by the time the reproduction process is being performed to generate the reproduction signal RF, the servo light emitted during the reproduction process necessarily cannot be emitted "at the same time" as Horimai's information light.

Horimai does not emit servo light at all during his recording process. The fact that Horimai does not emit servo light at the same time as information light is emitted during the recording process is further emphasized in his paragraphs [0140] and [0142] below (emphasis ours):

> "[0140] A recording operation will now be described … [0142] The output of light emitted by the light source device 25 is set at a high output to be used for recording in terms of the pulse thereof. Based on the basic clock reproduced from the reproduction signal RF, the controller 90 predicts timing at which light that has exited the objective lens 12 passes through the data areas 7 and maintains the above-described setting while the light from the objective lens 12 is passing through the data areas 7. While the light from the objective lens 12 is passing through the data areas 7, neither focus servo nor tracking servo is performed, and the objective lens 12 is fixed. The following description is on an assumption that the light source device 25 emits P-polarized light."

From the above-cited passages, it is therefore evident that Horimai does not meet the limitations of claim 1 that require "the servo beam being emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source." Hence, claim 1 is nonobvious over Horimai, whether singly or in combination with Amble.

The method of claim 1 further clarifies that the signal beam and the servo beam have different wavelengths and are emitted from different light sources, respectively first and second light sources. Specifically, claim 1 recites *inter alia* (emphasis ours):

> "*a* *signal beam* ... *emitted from a* *first light source* *and having a* *wavelength $\lambda 0$*" and "*a* *servo beam* *emitted from a* *second light source* *and having a* *wavelength $\lambda 1$ different from that of the signal beam*."

The Examiner admitted on page 5 (section 6) of the final Office Action that Horimai does not teach these features. Indeed and as previously argued by the present applicant on page 7 of the amendment filed on January 30, 2006, the light source device 25 of Horimai emits both the signal light and the servo light (but not at the same time). Since both the signal light and the servo light are being emitted from the same light source 25, his signal light and servo light necessarily have the same wavelength. Thus, Horimai necessarily does not meet the limitations of claim 1 that require first and second light sources for the signal beam and the servo beam, respectively, plus the different wavelengths $\lambda 0$ and $\lambda 1$.

The Examiner has cited Amble on page 5 (section 6) of the final Office Action as supplying the missing teachings of Horimai pertaining to the first and second light sources and different wavelengths. However, as previously explained above, Amble does not cure the deficiencies of Horimai, since the requirements for the signal beam from the first light source being emitted at a same time as the servo beam from the second light source, are not met in the proposed combination.

Hence, claim 1 is further nonobvious over Horimai, whether singly or in combination with Amble.

2. Independent claim 3 and dependent claim 4

Horimai and Amble, whether singly or in combination, do not render unpatentable the invention recited in independent claim 3. The apparatus of claim 3 recites *inter alia* (emphasis ours):

"*the first light source and the second light source being driven simultaneously, thereby simultaneously emitting the signal beam, the reference beam, and the servo beam.*"

These limitations of claim 3 are not met by either Horimai or Amble. With regards to Amble and as explained previously above, his servo beam 104 is not emitted simultaneously with the format hologram recording beams 100A and 100B. That is, the format hologram recording beams 100A and 100B are used to initially form the format hologram 106. Subsequently during a later read/write operation, the servo beam 104 is emitted while the read/write beam 102 is used to record (read/write) data. Thus, the servo beam 104 of Amble is being emitted *after* and not at the same time as emitting the format hologram recording beams 100A and 100B.

With regards to Horimai and as previously explained above, Horimai does not emit servo light during the recording process when he emits his information light. Instead, Horimai emits his servo light during the subsequent reproducing process in response to a generated reproduction signal RF. Thus, Horimai cannot meet the limitations of claim 3 that require simultaneously emitting the servo beam and the signal beam.

Furthermore, final Office Action has not cited any reference that meets this limitation. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted simultaneously with a signal beam from a second light source, is in itself evidence that no reference was available.

Moreover, Horimai does not meet the limitations of claim 3 that require a first light source to emit the signal beam having a wavelength $\lambda 0$ and a second light source to emit the servo beam having a wavelength $\lambda 1$. That is, since Horimai emits his signal light and servo light from the same light source 25 (not simultaneously), his signal light and servo light necessarily have the same wavelength and Horimai cannot meet the limitations of claim 3 that require first and second light sources. Amble does not cure these deficiencies of Horimai, since Amble emits his servo beam 104 after emitting his format hologram recording beams 100A and 100B, rather that simultaneous emission from the first and second light sources as recited in claim 3.

Claim 3 is not obvious and is therefore allowable.

Dependent claim 4 depends on claim 3, and thus is nonobvious for the reasons set forth above.

3. Independent claim 6

Horimai and Amble, whether singly or in combination, do not render unpatentable the invention recited in independent claim 6. The method of claim 6 recites *inter alia* (emphasis ours):

> "*the servo beam is emitted from the second light source at a* <u>*same time*</u> *as the signal beam and the reference beam are emitted from the first light source*."

These limitations of claim 6 are not met by either Horimai or Amble. With regards to Amble and as explained previously above, his servo beam 104 is not emitted simultaneously with the format hologram recording beams 100A and 100B. That is, the format hologram recording beams 100A and 100B are used to initially form the format hologram 106. Subsequently during a later read/write operation, the servo beam 104 is emitted while the read/write beam 102 is used to record (read/write) data. Thus, the servo beam 104 of Amble is being emitted *after* and not at the same time as emitting the format hologram recording beams 100A and 100B.

With regards to Horimai and as previously explained above, Horimai does not emit servo light during the recording process when he emits his information light. Instead, Horimai emits his servo light during the subsequent reproducing process in response to a generated reproduction signal RF. Thus, Horimai cannot meet the limitations of claim 6 that require emitting the servo beam and the signal beam at the same time.

Furthermore, final Office Action has not cited any reference that meets this limitation. The failure to cite at least one reference, teaching a servo beam from a first light source being emitted simultaneously with a signal beam from a second light source, is in itself evidence that no reference was available.

Moreover, Horimai does not meet the limitations of claim 6 that require a signal beam emitted from a first light source and having a wavelength λ0 and a servo beam emitted from a second light source and having a wavelength λ1. That is, since Horimai emits his signal light and servo light from the same light source 25 (not at the same time), his signal light and servo light necessarily have the same wavelength and Horimai cannot meet the limitations of claim 6 that require first and second light sources and different wavelengths. Amble does not cure these deficiencies of Horimai, since Amble emits his servo beam 104 after emitting his format hologram recording beams 100A and 100B, rather that emission from the first and second light sources at the same time as recited in claim 6.

Claim 6 is not obvious and is therefore allowable.

E. Section 103 rejection of claim 5 on the basis of Horimai and Amble and Matsui

Dependent claim 5 recites, *inter alia*, a "diffraction grating" and further includes the limitations of its base claim 3 that recite "a second optical path of a servo beam different from the first optical path of the signal beam." In rejecting claim 5, the final Office Action admitted on page 6 (section 7) that Horimai does not teach a diffraction grating, but nevertheless asserted that it would have been obvious to apply the diffraction grating of Matsui into the optics of Horimai. This assertion by the final Office Action is traversed herein.

As previously explained in the present applicant's prior amendment of January 16, 2007 on page 7, the signal beam, the reference beam, and the servo beam of Horimai are all emitted from the same light source 25. Indeed, the paragraphs [0135] and [0142] of Horimai quoted previously above describe the emission of servo light and information light from the same light source 25. Because the light source 25 is used for emitting (not simultaneously) both a servo beam and a signal beam, it necessarily follows that the servo beam and the signal beam will have the <u>same</u> wavelengths.

Therefore and as also previously explained in the present applicant's prior amendment of January 16, 2007, if a diffraction grating is placed in the optics of Horimai, the resulting optical paths of the signal, reference, and servo beam <u>must be the same</u> as each other. Stated another way, if the servo beam and the signal beam of Horimai impinge on a common

diffraction grating in the same optical path and the same incidence angle, then the optical paths of his servo beam and signal beam after they have passed through the diffraction grating must necessarily be the same, since the wavelengths of his servo and signal beams are the same. This is a fundamental concept/result due to the physical properties of a diffraction grating, as explained previously above.

Accordingly, if the diffraction grating of Matsui is placed in the optics of Horimai, the limitations of claim 5, which require <u>different optical paths</u> for the signal and servo beams (from base claim 3) and further require projection of the servo and signal beams onto different regions "after passing through an objective lens," cannot be met by the combination of these references since the resulting beams would travel in the same optical path. Accordingly, there is in fact a teaching against making the combination (*e.g.*, the diffraction grating of Matsui requires different wavelengths, whereas Horimai teaches the same wavelength), and/or the claim limitations would not be met if the references are combined (*e.g.*, the same optical paths would be produced the modified Horimai device).

Horimai and Matsui thus clearly use inconsistent/incompatible techniques that teach away from combining the two references. The Examiner *must* take the references in their entirety, and cannot simply ignore portions that *teach away* from the claimed subject matter or otherwise argue against obviousness. *Bausch & Lomb v. Barnes-Hind/Hydrocurve, Inc.*, 230 U.S.P.Q. 416, 420 (Fed. Cir. 1986). It is impermissible to pick and choose from a reference only so much of it as will support a conclusion of obviousness to the exclusion of other parts necessary to a full appreciation of what the reference fairly suggests to one skilled in the art. *Id* at 419. The courts have long cautioned that consideration *must* be given "where the references diverge and *teach away* from the claimed invention." *Akzo N.V. v. International Trade Commission*, 1 U.S.P.Q.2d 1241, 1246 (Fed. Cir. 1986). In other words, the Examiner has not explained why one skilled in the art would ignore the clear and unambiguous teachings of Horimai that clearly indicate that his servo and signal beams have the same wavelength, while the Examiner has instead chosen to isolate the teaching of Matsui of a diffraction grating that operates in conjunction with beams of different wavelengths, and has then combined this inconsistent and out-of-context teaching of Matsui into the optics of Horimai.

In view of the above, claim 5 is not obvious and is therefore allowable.

VIII. CLAIMS APPENDIX

1. A holographic recording and reproducing method a) for recording data in a holographic recording medium comprising at least a recording layer in which data are to be recorded as phase information of light by projecting a signal beam and a reference beam emitted from a first light source and having a wavelength $\lambda 0$ thereonto and a servo layer disposed on an opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the holographic recording medium having regions in which servo projection structures are formed and b) for reproducing holographic data from the holographic recording medium by projecting the reference beam onto the holographic recording medium, the holographic recording and reproducing method comprising:

setting a first optical path of the signal beam so that the signal beam is projected onto other regions of the servo layer than regions in which the servo projection structures are formed; and

setting a second optical path, different than the first optical path, of a servo beam emitted from a second light source and having a wavelength $\lambda 1$ different from that of the signal beam so that the servo beam is projected onto one of the regions of the servo layer in which the servo projection structures are formed after passing through an objective lens through which the signal beam passes and projecting the servo beam onto the servo layer along the thus set optical path of the servo beam,

the servo beam being emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source.

3. A holographic recording and reproducing apparatus a) for recording data in a holographic recording medium comprising at least a recording layer in which data are to be recorded as phase information of light by projecting a signal beam and a reference beam thereonto and a servo layer disposed on an opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the holographic recording medium having regions in which servo projection structures are formed and b) for reproducing holographic data from the holographic recording medium by projecting the

reference beam onto the holographic recording medium, the holographic recording and reproducing apparatus comprising:

signal beam path setting means including an objective lens for converging the signal beam and adapted for setting a first optical path of the signal beam so that the signal beam is projected onto other regions of the servo layer than regions in which the servo projection structures are formed;

servo beam path setting means for setting a second optical path of a servo beam different from the first optical path of the signal beam so that the servo beam is projected onto one of the regions of the servo layer in which the servo projection structures are formed after passing through an objective lens through which the signal beam passes and projecting the servo beam onto the servo layer along the thus set optical path of the servo beam;

a first light source to emit the signal beam and the reference beam having a wavelength $\lambda 0$; and

a second light source to emit the servo beam having a wavelength $\lambda 1$,

the first light source and the second light source being driven simultaneously, thereby simultaneously emitting the signal beam, the reference beam, and the servo beam.

4. A holographic recording and reproducing apparatus in accordance with Claim 3, wherein the servo beam projecting means comprises beam deflecting means for deflecting the servo beam in a predetermined direction so that the servo beam impinges on the objective lens with an incidence angle different from that of the signal beam.

5. A holographic recording and reproducing apparatus in accordance with Claim 4, wherein the beam deflecting means comprises a diffraction grating disposed on an incidence side of the servo beam with respect to the objective lens.

6. A holographic recording and reproducing method a) for recording data in a holographic recording medium comprising at least a recording layer in which data are to be recorded as phase information of light by projecting a signal beam and a reference beam emitted from a first light source and having a wavelength $\lambda 0$ thereonto and a servo layer disposed on an

opposite side of the recording layer as viewed in a direction of signal beam incidence on the holographic recording medium, the servo layer having servo projection structures b) for reproducing holographic data from the holographic recording medium by projecting the reference beam onto the holographic recording medium, the holographic recording and reproducing method comprising:

setting a first optical path of the signal beam so that the signal beam is projected onto a first region of the servo layer different from second regions of the servo layer on which the servo projection structures are formed;

setting a second optical path, different than the first optical path, of a servo beam emitted from a second light source and having a wavelength $\lambda 1$ different from that of the signal beam so that the servo beam is projected onto one of the second regions of the servo layer on which the servo projection structures are formed, after passing through an objective lens through which the signal beam passes; and

projecting the servo beam onto the servo layer along the thus set second optical path of the servo beam,

wherein the servo beam is emitted from the second light source at a same time as the signal beam and the reference beam are emitted from the first light source.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

Respectfully submitted,

Seed Intellectual Property Law Group PLLC

/Dennis M. de Guzman/

Dennis M. de Guzman
Registration No. 41,702

DMD:sc

701 Fifth Avenue, Suite 5400
Seattle, Washington 98104
Phone: (206) 622-4900
Fax: (206) 682-6031

1030552_1.DOC